Ecological space

JWI

Just World Institute

www.sps.ed.ac.uk/jwi

Ecological space: the concept and its ethical significance

Tim Hayward

May 2013

JWI Working Paper

No. 2013/02

THE UNIVERSITY of EDINBURGH

Ecological space: the concept and its ethical significance
Tim Hayward
JWI Working Paper 2013/02
First published by the Just World Institute in May 2013

Just World Institute, University of Edinburgh, Chrystal Macmillan Building, 15A George Square, Edinburgh EH8 9LD
Web: http://www.sps.ed.ac.uk/jwi

Acknowledgements

This paper draws on research conducted with the gratefully acknowledged support of British Academy Senior Research Fellowship (SRF/2007/32) and Leverhulme Research Fellowship (RF/8/RFG/2008/0179). I also thank members of the University of Edinburgh's Political Theory Research Group for helpful comments on an earlier draft.

The paper, in a final version, will appear as a chapter in the forthcoming *Oxford Companion to Environmental Ethics*.

Any comments that will help make improvements for the published version will be very welcome.

Introduction

Ecological space is relevant to ethics not in virtue of being an evaluative term or referring directly to any determinate object of evaluation. It is primarily a descriptive term. What is to be shown here, though, is how what the term refers to does, when spelled out and thought through, have considerable and distinctive ethical significance, particularly with regard to global justice and human rights. Use of the concept allows us to capture, particularly well, something morally important about the way humans' moral relations with one another are mediated through multifarious *natural* relations.[1]

Ethical implications of the concept of ecological space can be drawn out from the focus it brings to issues arising from the finitude and vulnerability of habitats. In this planet's biosphere, there has always been competition of various kinds – within, among, and between species, populations and communities of organisms – for adequate environmental resources. The complexity of life, of course, also means that many organisms are themselves environmental resources for others. These natural ecological processes in themselves are hardly appropriate, or even possible, matters for ethical regulation by humans. Ethical questions do arise, however, when consciously directed activities of human beings cause harm to the environments or resources that other human beings depend on. Ethical questions also arise when humans cause harm to the environments or resources of members of species other than *Homo sapiens*, or indeed when they directly harm those members themselves;[2] but for the present exposition, I shall confine attention to questions of intra-human ethics.

1. Ecological Space: its descriptive meaning

The ethical significance of the concept of ecological space can perhaps best be revealed through developing an understanding of how it can support and inspire a particular *way of*

[1] For an interesting relevant discussion of natural relations see Benton (1993). On the specific use of the idea of ecological space in normative argument see e.g. Hayward (2006; 2007).

[2] Questions of animal ethics, ecocentrism in ethics, and so on, constitute important fields of inquiry in their own right. Here my aim is simply to establish how the idea of ecological space can be used in the construction of ethical arguments; it could well be used for arguments involving concern for non-humans.

seeing.[3] This may be captured by considering how some basic principles of ecology can be brought to bear on the concept of space.

The concept of space, in general and in the abstract, implies nothing that can be pictured, being the pure constitutive form of appearance of extended objects in reality as we experience it. Space as we refer to the term in any determinate context, however, is always thought of under a particular sort of description: different kinds of space can be conceptualised according to different knowledge constitutive interests – cosmological space, geographical space, psychological space, personal space, and so on. Understanding the distinctive kinds of function of *ecological* space, in relation to human interests, is the key to understanding its ethical significance.

Ecology – the science and the reality studied by it[4] – concerns the complex interrelationships between and among organisms and their environments. These interrelationships take place in extended space, to be sure, but we can distinguish ecological space from geographical and topographical descriptions. The relevant space is defined more by function than by physical dimension or magnitude.

This point and its implications can helpfully be brought out by thinking of ecological space – the generic concept – as what is provided for particular species or populations by their ecological *niche*. The niches of a variety of species may be found in the same physical location. Each niche is a particular kind of functional space that furnishes the sum of the habitat requirements that allow members of a species to persist and produce offspring. The idea of a niche in the ecological sense thus conveys that of a 'space' for organisms to live in that is defined by parameters other than of physical extension.[5] We are also familiar with use of the idea of a niche used figuratively in other contexts – like niche products, finding one's niche within a broader social or organisational context. We tend to use the term for more

[3] I find it appropriate to adopt the expression that provides the title for Berger's (1972) book here. As will become clear, I shall be contrasting this way of seeing particularly with the worldview of liberal political economy.

[4] For more on the basics of ecology, particularly as they can be used to inform social and political theory, see Hayward 1995.

[5] Definitions of the ecological idea go back to the early twentieth century, but it was influentially formulated by the zoologist G. Evelyn Hutchinson (1958) when seeking to account for how there can be so many different types of organisms in any one habitat. Hutchinson conceptualised the niche in terms of a 'hypervolume', a multi-dimensional 'space' of resources and environmental conditions (e.g., light, nutrients, structure, etc.) that are available to (and specifically used by) the organisms that require them.

marginal institutional habitats, but that is because it is in such circumstances that we are more *aware* of the special conditions necessary for survival of the entity or enterprise in question. There are, of course, much bigger niches whose conditions are more taken for granted.

In fact, the taken-for-granted nature of so many vital environmental conditions is a major factor in bringing us to the environmental crises we now face. Human beings have expanded their (*realized*[6]) niche – i.e. the niche that they actually live in – on this planet quite considerably. We can adapt ourselves to a wide variety of habitats, because – or, more exactly, in virtue of the fact that – we can adapt the habitats themselves to our needs. We do not fundamentally alter the human organism's need for nutrition, hydration, a certain air temperature and pressure range, and so on (i.e. the conditions that ecologists refer to as our *fundamental*, as opposed to realized, niche); we use technological devices to provide what is needed when the immediate natural environment does not. In this sense, as Bill Freedman observes, 'humans have utilized technological innovations to greatly expand the boundaries of their realized niche. Humans can now sustain themselves in Antarctica, on mountain tops, in the driest deserts, in phenomenal densities in cities, and even in spacecraft.' (Freedman, internet resource)

Our relation to the rest of nature, then, is highly mediated now that very complex technological and social constructions provide settings for individual human organisms, communities, populations and – ultimately – the whole species to live in, and in ever changing ways. Indeed, humans are the species in this biosphere that has a *history*, as distinct from simply a co-evolutionary record. The distinctive history of humans, their various communities and populations, is all about their changing modes of technological adaptation to, and of, their environments in conjunction with changing modes of social organisation.[7] It is also striking how, in recent times, a phenomenal expansion of humanity's realized niche has allowed a great increase in the abundance of humans. This seems to set humans apart from other animal species, which, for the most part, have a realized niche that is smaller than their fundamental niche due to the conditions necessary for their flourishing providing support also to predators and competitor species. But humans are not exempt from ecological constraints.

[6] Ecologists distinguish between the fundamental niche of a species – the general conditions functionally required for its persistence and reproduction – and its realized niche. The latter refers to the actual, realized, circumstances that pertain for a given population (see e.g. Hutchinson, 1958; Freedman, internet resource).

[7] Seen in this way, the materialist view of history as adopted by Karl Marx, for instance, is a particular version of such an account. For an appreciation of the ecological insights of Marx, and also importantly Engels, see e.g. John Bellamy Foster (2000).

As Freedman points out, 'it must be understood that the remarkable technological expansions of the realized niche of humans require large and continual subsidies of energy, food, and other resources. These are needed in order to maintain the colonization of difficult environments and to continue the control of constraining ecological influences. If access to these resources is somehow diminished, then the ability of humans to colonize and manage their environment is diminished as well, or it collapses.' (Freedman, internet resource)

This fact – that we always ultimately remain a part of nature and subject to its constraints – is one that is not only ignored but is sometimes even denied in the way of seeing the world that has tended to dominate our culture in recent times. Having become accustomed to an expansionary vision of the world, it seems, we have failed adequately to appreciate the ecological contingency of the fine web of interrelationships on this planet. The 'way of seeing' that has dominated modern Western thought includes a basic depiction of Man (advisedly gendered) as set over against the rest of nature, in a world that has a lot of empty space to be filled by his products, these being wrought through the mastering of the natural objects and processes that He discovers and invents. Man came to feel Himself 'independent' of nature in important ways. It is this attitude that is perhaps most tellingly criticised as 'anthropocentrism' (see Hayward 1997b; also 1997a), whereby attributes of power and transcendence vis-à-vis nature that were once projected onto deities came to be arrogated to human beings. Indeed, green thinkers have long referred critically here to a nexus of attitudes captured by terms like Promethean, hubristic, dualistic, technocentric – as well as anthropocentric – that all capture aspects of the idea of man using 'rationality' to 'dominate' a nature which is ready to submit to his superior ingenuity and industriousness.

The ecological space of the human species has in modern times undergone such changes that the very fact of our critical dependence on it has been lost to view for many of us in the industrialised world. We know, though, that peoples who live in direct contact with the land and depend directly for their lives and livelihoods on the survival and flourishing of local flora and fauna see a dense, complex, and vulnerable world immediately around them. They are of necessity acutely aware that they depend on ecological space that needs to be sustained in their geographical vicinity. In the highly industrialised and technologically developed world our relationship with the ecological space we depend on has become so complex and highly mediated that hardly any of us has very much appreciation of it at all. The 'imaginary' that has informed Western thinking in recent centuries has consisted of impressions of geographical space with wide open spaces, endless frontiers, outer space, and so on, with an abundance of

resources that unbridled human ingenuity will ever find innovative ways to valorise. The truth, of course, is that none of the things that are treated for practical purposes as unbounded or infinite actually is. The scale of our alterations of ecological relations has become so great that we are being forced to recognize that we inhabit a contained, dense biosphere that is being put under enormous strains. Our increasing demands on its capacities makes the space increasingly crowded.

The planet's biosphere is crowded in the sense that the demands placed by the world's human population on its 'ecological space' are such that some members do not have adequate for their health and well-being. One aspect of this problem is the finitude of the earth's aggregate biophysical capacity such that can support a finite amount of organisms in general and human organisms in particular. Another aspect of the problem is that some humans make vastly more use of the planet's 'ecological space' than others do. The very different realities of lives lived in affluence or in poverty owe their tangibility to the differential capacities to command ecological space: the wealthy have an ecological footprint that covers so much of the globe while the poor are ecologically marginalized and deprived of access to resources on their own doorstep.[8] In fact, the discrepancies and inequalities are more marked even than shows up by analyses of relative resource usages, for the ways in which ecological space figures in institutionalised social practices go very much beyond the direct metabolism of human individuals with their ecological surroundings.

It is therefore appropriate to reflect a little more closely on how we do things with ecological space.

2. How to do things with ecological space

Since ethics applies to the conduct of agents, and justice to the institutional framework within which they act, the full normative significance of ecological space has to be understood in relation to the things people are permitted, required, or forbidden to do, according to the norms of the institutional orders they belong to. When talking about ecological space in relation to the prospective normative assessment and regulation of human activities, I recommend differentiating between using, occupying and commanding ecological space. It is in relation to the activities comprehended under these various descriptions that deontic categories – of prescription, proscription and permission – can be applied.

[8] In the next section I shall further explain why 'command' of ecological space can go even beyond measurable ecological footprints.

i) *Use* is the term we can use to refer to the most direct relationship a human being has with ecological space and its constituent functionings. As an organism in an immediate biophysical environment, a human being uses ecological functionings in order to maintain itself in life. This endosomatic use is the most elemental manifestation of the 'human metabolism with nature'. Ecological space can also be used exosomatically by a human being as an intentional agent, consciously, for productive purposes that are not for the immediate sustenance of the human body.[9] Then the interaction of body and environment is mediated in various ways, as human biophysical capacities are expanded and amplified by the use also of abiotic and non-renewable resources as well as by technological innovations. Through technologies of all kinds (from the most rudimentary tools to vastly complex configurations of infrastructure) – and in consort with others of our kind (and also the secondment of creatures of other kinds) – our bodily power can be greatly amplified so that we are enabled to do all sorts of things that otherwise would be impossible. Such interventions enable us to interact with nature at a distance and to use ecological functionings from various places in various ways. They also enable us to use non-renewable resources in new and powerful ways, to further amplify and consolidate our transformative power in relation to the natural world.

But we should also note that the use of ecological space in externally productive activities can be more or less efficient, depending on the quality of technique applied. Thus, considering matters from the point of view of humans, the amount of ecological space available can effectively (i.e. functionally) be increased through the development of technique: it is not so much that anything changes in external reality – for the functionings in ecological space do not necessarily change – but what happens is that we can become increasingly nuanced in our appreciation of the qualitative constitution of it and develop correspondingly sophisticated practical skills in using it, as, for instance, with the processes involved in learning how to get more and more computing power from the use of smaller and smaller pieces of silicon. So, as well as being used, ecological space can, in that sense – i.e. from the perspective of effective human intentionality – be *expanded*.[10] Any innovation that shows us how to access functionings in the natural world that we had not previously understood can be said to do this.

[9] On the exosomatic, and archetypically social, utilization of ecological space see the seminal contributions to ecological economics of J. (Hans) B. Opschoor (e.g. Opschoor, 1995).

[10] This is how the expansion of humans' realized ecological niche appears from the standpoint of a social scientific, as opposed to a scientific ecological, interest.

Use of ecological space is also not bound by geography. For instance, the food I eat is in proximity to me at the moment I ingest it, but it might be grown on the other side of the world; in general, the products we use, however physically intimate they might become, can originate from external metabolic transactions with the natural world in far-flung places. It is this general idea that is conveyed – at least in part – by the idea of an ecological footprint (Wackernagel and Rees, 1996).[11] And we are familiar now with the general idea that the footprint of a given population can be portrayed as larger or smaller than that population's geopolitically designated territory. But there is also a further dimension to consider in relation to how ecological space may be used by people in one geographic location that is physically located in another geographical location. This is a distinctly social dimension that does not necessarily imply anything directly to do with use.[12]

ii) ***Occupation*** of ecological space can occur without the actual use of any of its constituent functionings. This possibility, however, can only be described from a social perspective, not a purely ecological one. It signifies a relation between people and ecological space that depends on acceptance of particular social norms for its possibility. An analogy would be the situation in which an empty theatre seat is said to be occupied: the convention of reserving seats gives sense to what would, under a purely physical description, be a self-contradictory proposition: 'the empty seat is occupied'. When one occupies a physical space in this manner, what one does is retain the option for oneself to use it while excluding others from exercising such an option, as long as they share a commitment to the salient normative expectations. Likewise, occupying ecological space is an idea that does not represent any facts about the *natural* world; it is understood as a purely social, *normative*, category; it can only apply when norms with the effect of *property* incidents are recognized as valid.[13] But it is highly relevant when we think about claims of property and right that involve access for some and exclusion for others. It is a crucial part of understanding how people can acquire and control more ecological space than they could ever actually make use of. When vast numbers of people are ecologically marginalized by the activities of a relatively small number we can only understand

[11] The idea of the footprint being two-dimensional, and operationalized through a specific set of indicators, themselves based on various assumptions of both factual and evaluative kinds, means it only does capture an aspect of ecological space – rather like a particular photograph can only capture a particular aspect of a scene. But also like a photograph, the footprint analysis can still portray a good deal.

[12] I suspect, although it is not my field, that there must be interesting research questions still to ask about how the various biophysical measures used to track movements of ecological assets of various kinds through trade and dispersed production methods are related to economic and property relations.

[13] On the idea of property incidents see the seminal contribution of Honoré (1961).

how this could happen by examining the normative relations between the different kinds of people.[14]

iii) By ***Command*** of ecological space I understand a potentiality that presupposes the possibility of occupying it, but does not necessarily entail actually occupying it. Such command can be manifest as a power to create or extinguish rights of exclusion. One commands ecological space to the extent that one has the power or capacity to make an effective decision to acquire or occupy ecological space that currently is owned or used by another. This would be the power or capacity, as typically represented by the holding of assets, (including money, bonds, promissory notes, and so on, that physically manifest no ecological space at all,) to take possession, through a transaction, either of goods or services that do embody ecological space, or of rights of occupation of ecological space. In a market economy, where most things can be exchanged, subject to agreement on price, money wealth effectively represents *command* of ecological space. At any moment, a holder of money wealth could convert the money into holdings that embody actual ecological space. This potentiality is of considerable significance: we glimpse this when abstract and speculative transactions on global commodity markets, for instance, have very dramatic effects on lives and livelihoods of very many people in ecologically marginalised situations in the world. Financial wealth represents very real power over people's lives.

Command of ecological space thus operates through the creation and exercise of property rights. As Jeremy Waldron has put it, 'property is a matter of rules about access to and control of material resources': it is not necessarily about ownership, but wealth is constituted for the most part by one's property relations: one may not own many resources, but the shares one holds, the funds one is involved in, and so on, define a person's position so far as access to and control of material resources is concerned (Waldron 1985, 325). In similar vein, I would maintain that wealth is appropriately understood as the capacity to command resources, whatever the circuitousness of the connection between paper or digitally-encoded assets and the material world they can ultimately be exchanged for.

Command of ecological space does not have to take the form of financial wealth, however, and nor do property rights have to be private or individual. It is possible for property rights – and this especially applies to those incidents (and combinations thereof) that come closest to

[14] The requisite understanding can build on suggestive traditions of conceptual analysis of normative thought from e.g. Ockham ([1332]) to Ostrom (e.g. Schlager and Ostrom, 1992).

providing full *dominium* with respect to their object – to be held by a people or a sovereign, for instance. Ecological space, in fact, due to its inherent territorial extension, can be commanded within a regime of territorial rights too.[15] Here, command of it is manifest not as monetized claims but in the form of ultimate powers of control over physical access to it. Typically, this is a corollary of a state having a monopoly of legitimate force within the territory under its control. In virtue of commanding what Avery Kolers refers to as geospace, a political authority can also control the use of the ecological space that is located within it. A rich and powerful state, then, can 'import' a good deal of ecological space from other territories while remaining firmly in control of the ecological space within its territorial borders. This situation, from a certain ethical perspective, would seem to be a circumstance of compound injustice; it is a circumstance in which the linkage between issues of poverty and environment globally is particularly stark.

§ Ecological space as a concern of human rights

An evident ethical concern relating to ecological space is that each person should have access to use of it such as is sufficient for them thereby to be enabled to lead at least a minimally decent life. For I presume we would find hard to recognize as an ethical proposition the contrary suggestion that it is acceptable for some people to be denied the legitimate expectation of being allowed access to what they need to live a minimally decent life. We can thus – with relatively little argumentative apparatus – derive the normative proposition: To deprive a person of access to needed ecological space is wrong.

In light of the terms in which ethical discourses are generally conducted in our times, a reasonable interpretation of that proposition is to say that it implies a human right of access to sufficient ecological space.[16] Human rights language refers to those interests, common to all individual humans, that are deemed significant enough to warrant normative protection by

[15] This is something that Avery Kolers (2012) has highlighted when pointing out that a political regime governing a territory can make various kinds of exploitative 'use' of its ecological resources without actually consuming them.

[16] The initial simple proposition does, of course, leave open a number of consequent questions, as, for instance: What if the deprivation is, in some cases, unavoidable? What is the definition of a *decent* life? How does one determine what, exactly, and how much of it, is (minimally) needed? Would it also necessarily be wrong to fail to give a person what is needed, and if so wrong of whom? What about space that is more than is needed? But these familiar questions can in fact be asked in relation to established human rights too. On this general question, see Hayward (2005).

collective legal, political, and even more directly coercive means.[17] The individual human interest in having access to the means to support one's biological life is clearly of such a kind. I suggest that it is part of the 'morality of the depths' that Henry Shue (1980) has influentially referred to; it is a *basic* right in the sense of being a precondition of enjoying any further rights. Such a right takes moral precedence, *ceteris paribus*, over less directly important rights when its enjoyment is imperilled. The human right of access to such ecological space as is biophysically necessary relates, in the first place, to the endosomatic use of ecological functionings by our organic bodies. The opportunities to engage in that use, though, can be promoted or inhibited by things that other people do: the exosomatic use of ecological space by others can, as can its occupation by others, inhibit the enjoyment of an individual human's right to its (endosomatic) use. Therefore an individual's right to sufficient ecological space can be compromised or violated in a variety of complex and mediated ways.

Now the discourse of rights presupposes that there are duties to make good the claims of right; and one general issue that needs to be acknowledged is that people may sometimes find themselves without access through no fault of anyone else's; so who has any duty in such a situation? I think an appropriate answer to this and related questions is to adopt the general framing advocated by Shue. He suggests we should recognize three general kinds of duties that answer to basic rights: duties not to deprive; duties to protect against deprivation; and duties to assist those who have suffered deprivation. Duties to protect or assist would fall on those, or a subset of those, who have the ability to protect or assist.[18] But here I would like to say a little more about the duty not to deprive.

The duty not to deprive another of access to needed ecological space applies, in principle, to everyone. In practice, however, the opportunities to deprive someone else of access to ecological space depend on coordinated activities of often very complex kinds such that one's individual role or contribution in the deprivation may not be clear. Most of the ways in which we use and benefit from ecological space are such that the connection with the ecological marginalization of others is far from easy to trace. Explanatory accounts of the global political

[17] This is not the place to engage in theoretical debates about what human rights 'are' and I have tried to offer a gloss that would be reckoned a reasonable description of language use even by critics of interest theories of rights or sceptics about the status of universalistic claims.

[18] An ability to protect or assist is a necessary condition of having a duty to do so (on the principle that ought implies can); it is a matter for further debate whether some principle of causation, for instance, of benefiting or being advantaged, is also a necessary condition. (Comparable considerations are familiar from recent debates about climate justice, for a summary of which see Hayward, 2012.)

economy that would seek to reveal the connections globally between affluent classes' advantages and deprived classes' disadvantages are liable to be contentious under present circumstances. What can less controversially be shown, however, is the structure of those patterns of advantage and disadvantage, whatever its explanation may be. For it is evidenced in the sum of documentation of the system of property rights that is maintained globally and can be tested in courts of law and other legal institutions around the world.

It is property rights that secure some in the possession, occupation and command of more access to ecological space than can be ethically justified while others remain excluded from access even to bare sufficiency. Thus the human right of access to ecological space, even for the most basic and directly necessary forms of use, can be compromised or violated by the assertion of such property rights. The radical inequalities that afflict the world today[19] are manifest in the worst off being excluded from access to ecological space, as well as to non-renewable resources or the exchange value yielded by them as commodities.

In view of this situation, I would therefore commend one further normative proposition: in any case where the human right of access to sufficient ecological space to maintain a decent life comes into conflict with a mere right of property, the latter should yield.[20]

References

Benton, Ted. (1993) *Natural Relations: Ecology, Animal Rights and Social Justice*. Verso.

Berger, John. (1972) *Ways of Seeing*. Penguin UK.

Foster, John Bellamy (2000) *Marx's Ecology: Materialism and Nature*. NYU Press.

Freedman, Bill (internet resource) 'Niche - What Is The Niche Of Humans?' Accessed April 30, 2013. http://science.jrank.org/pages/4664/Niche-What-niche-humans.html.

Hayward, Tim (1995) *Ecological Thought: An Introduction*. Cambridge, UK : Polity Press; Cambridge, MA: Blackwell.

[19] For seminal discussions of the idea of radical inequality see Nagel (1997) and Pogge (2002).

[20] By 'mere' right of property I mean any property right for which no human rights justification can directly be adduced. I do not suggest this proposition would be uncontroversial; but I do suggest it follows if my previous argument for considering a right of access to ecological space as a basic right is accepted, and if such claims of right are understood as embodying peremptory ethical demands that can trump morally less demanding claims.

Hayward, Tim (1997a) 'Anthropocentrism: a misunderstood problem', *Environmental Values* 6(1): 49-63.

Hayward, Tim (1997b) 'Anthropocentrism', in Ruth Chadwick, ed., *Encyclopedia of Applied Ethics*, Academic Press Inc., San Diego, California.

Hayward, Tim (2005) *Constitutional Environmental Rights*, Oxford University Press.
Hayward, Tim (2006) 'Global Justice and the Distribution of Natural Resources', *Political Studies* 54(2): 349–369.

Hayward, Tim (2007) 'Human Rights Versus Emissions Rights: Climate Justice and the Equitable Distribution of Ecological Space', *Ethics & International Affairs* 21(4): 431–450.

Hayward, Tim (2012) 'Climate Change and Ethics', *Nature: Climate Change* 2: 843-848.

Honoré, A. M. (1961) 'Ownership' in *Oxford Essays in Jurisprudence,* edited by A. G. Guest. Oxford: Clarendon Press: 107-147.

Hutchinson, G. E. (1958) 'Concluding remarks', *Cold Spring Harbor Symposia on Quantitative Biol*ogy 22: 415-427.

Kolers, Avery (2012) 'Justice, Territory and Natural Resources', *Political Studies* 60(2): 269–286.

Nagel, Thomas (1977) 'Poverty and Food*:* Why Charity Is Not Enough', in P. G. Brown and Henry Shue (eds.), *Food Policy: The Responsibility of the United States in Life and Death Choices*. New York, Free Press.

Ockham, William of ([1332]) *Opus nonaginta dierum* in Offler, H. S. et al., eds. *Guillelmi de Ockham Opera politica*. Vol.2 (1956). Manchester University Press.

Opschoor, J. (Hans) B (1995) 'Ecospace and the Fall and Rise of Throughput Intensity', *Ecological Economics* 15(2): 137–140.

Pogge, Thomas (2002) *World Poverty and Human Rights*, Polity Press.

Schlager, Edella, and Elinor Ostrom (1992) 'Property-Rights Regimes and Natural Resources: A Conceptual Analysis', *Land Economics* 68(3): 249–262.

Shue, Henry (1980) *Basic Rights: Subsistence, Affluence, and U.S. Foreign Policy*, Princeton University Press.

Wackernagel, Mathias and Rees, William (1996) *Our Ecological Footprint: Reducing Human Impact on the Earth*, New Society Publishers.

Waldron, Jeremy (1985) 'What is Private Property?', *Oxford Journal of Legal Studies* 5(3): 313-349.